The Refrigeration Service Engineer

SEPTEMBER • 1935

Servicing Universal Cooler Commercial Equipment • Questions and Answers • Motor Trouble Charts • New Mechanical Devices • Service Suggestions

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The REFRIGERATION SERVICE ENGINEER

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REFRIGERATION UNITS *and* OIL BURNERS

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Servicing and Installation Pointers on Universal Cooler Commercial Refrigerating Equipment

This Article Describes the Installation and Servicing of Various CH3CL Models of Universal Cooler Air and Water-Cooled Condensing Units.

UNIVERSAL COOLER commercial equipment, manufactured by the Universal Cooler Corp., Detroit, Mich., is built in sizes from ¼ hp. to 15 hp. capacities. All sizes of 1935 models are built for methyl chloride as the refrigerant. In addition, to the methyl chloride units the following sizes are also built for Freon: 1 hp. 2 cylinders, 1½ hp. 2 cylinders, 2 hp. 2 cylinders, 3 hp. 3 cylinders, 5 hp. 3 cylinders, 7½ hp. 3 cylinders, 10 hp. 3 cylinders, 15 hp. 3 cylinders.

The table on the following page lists some of the important general specifications for the 1935 models.

The Universal Cooler compressor employs the splash-type of lubricating system. The condenser on the air-cooled models is of the continuous fin-tube type construction, while on the water-cooled models is found the double-tube type, using the counterflow principle. Controls are either Penn or Detroit Lubricator pressure-controlled, and either Penn or Electrimatic water regulating valves are used on 1935 models.

The following models, which are described and found in general use in the field today, are more familiarly known as the U-Type Condensing Units. Because many of the readers of THE REFRIGERATION SERVICE ENGINEER undoubtedly come in contact with this particular type on service calls, the general information is published in tabulated form.

In Fig. 1 is shown the general cycle of operation of the Universal Cooler system. Fig. 2 shows general types of Universal condensing units.

General Suggestions on Commercial Installations

The following installation suggestions are excerpts of instructions contained in the service manual of this company.

Commercial installations can be divided into two classes—those installed in new

SPECIFICATIONS FOR 1935 UNIVERSAL COOLER MODELS

Model* (See note at foot)	Hp. of Motor	No. of Cylinders	Bore and Stroke in Inches	Quantity of Refrigerant (all methyl except where Freon is indicated)	Quantity of Oil
251-A	¼	1	1 13/16 x 1½	2 lbs.	1 pt.
332-A	⅓	2	1 13/16 x 1½	3½ lbs.	2½ pt.
W-332-W	⅓	2	1 13/16 x 1½	3½ lbs.	2½ pt.
502-A	½	2	2¼ x 1½	4 lbs.	3 pt.
W-502-W	½	2	2¼ x 1½	4½ lbs.	3 pt.
752-A	¾	2	2¼ x 2	4½ lbs.	3 pt.
W-752-W	¾	2	2¼ x 2	5 lbs.	3 pt.
1002-A	1	2	2¼ x 3	8 lbs.	6 pt.
AW-1002-W	1	2	2¼ x 3	12 lbs. Freon	6 pt.
W-1002-W	1	2	2¼ x 3	8 lbs.	6 pt.
1502-A	1½	2	2½ x 3	8 lbs.	6 pt.
AW-1502-W	1½	2	2½ x 3	12 lbs. Freon	6 pt.
W-1502-W	1½	2	2½ x 3	8 lbs.	6 pt.
2002-A	2	2	2½ x 3	8 lbs.	6 pt.
AW-2002-W	2	2	2½ x 3	12 lbs. Freon	6 pt.
W-2002-W	2	2	2½ x 3	8 lbs.	6 pt.
W-2003-W	2	3	2½ x 3	12 lbs.	8 pt.
AW-2003-W	3	3	2½ x 3	14 lbs. Freon	8 pt.
W-3003-W	3	3	2½ x 3	12 lbs.	8 pt.
AW-5003-W	5	3	3¼ x 3	16 lbs. Freon	9 pt.
W-5003-W	5	3	3¼ x 3	14 lbs.	9 pt.
AW-7503-W	7½	3	4 x 4¼	20 lbs. Freon	12 pt.
W-7503-W	7½	3	4 x 4¼	17½ lbs.	12 pt.
AW-10003-W	10	3	4 x 4¼	20 lbs. Freon	12 pt.
W-10003-W	10	3	4 x 4¼	17½ lbs.	12 pt.
AW-15003-W	15	3	4 x 4¼	22 lbs. Freon	12 pt.
W-15003-W	15	3	4 x 4¼	19 lbs.	12 pt.

*Cylinder head is cooled by air on all air-cooled models, and water on all models with prefix "W" or "AW" before model numbers. The letter following the model number indicates the method of condenser cooling, either air or water.

buildings and those in old buildings. In new buildings, a great deal of labor may be saved and a neater installation can be made by roughing in the tubing before the walls are lathed and plastered. Even in old buildings, a great deal of tubing can be concealed. In some cities, the building code requires that all tubing shall be protected by rigid conduit, and all valves and connections installed in metal boxes which are readily accessible. Before making a commercial installation, it is always advisable that a little thought be given to the job and considerable work can oftentimes be saved by making a rough layout or sketch of the proposed installation before proceeding with the work. Check the dimensions of the box or case and make sure that the equipment recommended is adequate and will fit the bunkers. It is, of course, most desirable that correct locations be selected for the condensing units, which should be set in cool, dry, well ventilated places which are centralized in relationship to runs of tubing. If the condensing unit is water-cooled, it cannot be installed in a place that will reach freezing temperatures. The question of noise should also be considered. Even when the unit is obviously quiet, it may be objectionable to some people. Water-cooled units are quieter and more efficient for commercial installations than air-cooled units. Where water-cooled units are to be used, make sure that there is a water supply available as well as a drain.

Running Refrigerant and Water Lines

All units up to and including Model W752 (¾ hp.) use ½" suction line tubing. Models 1002, W1002, 1502, W1502 and W2002 use ⅝" tubing. Models W2003, W3003 and W5003 use two ⅝" suction lines and one 1" piping, and Models W7503 and W10003 use 1½" pipe.

1. Pull all upright or riser tubing first. Fasten, where possible, with ⅜" pipe straps insulated with friction tape to prevent transmission of any noise from the unit.

Model	Compressor	Hp.	Refrigerant Charge		Oil Charge	Suction Connection		Liquid Connection Size
			CH3CL	F-12		No.	Size	
251	Std. Single	¼	2 lbs.	2 lbs.	¾ pt.	1	⅜ in.	¼ in.
251BI	Std. Single	¼	2 lbs.	2 lbs.	¾ pt.	1	⅜ in.	¼ in.
251P	Std. Single	¼	2 lbs.	2 lbs.	¾ pt.	1	⅜ in.	¼ in.
332	Std. Twin	⅓	3½ lbs.	3½ lbs.	3 pt.	1	½ in.	¼ in.
332BI	Std. Twin	⅓	3½ lbs.	3½ lbs.	3 pt.	1	½ in.	¼ in.
332P	Std. Twin	⅓	2½ lbs.	2½ lbs.	3 pt.	1	½ in.	¼ in.
W332	Std. Twin	⅓	3½ lbs.	2½ lbs.	3 pt.	1	½ in.	¼ in.
W332BI	Std. Twin	⅓	3½ lbs.	3½ lbs.	3 pt.	1	½ in.	¼ in.
502	Super Twin	½	4 lbs.	4 lbs.	3 pt.	1	½ in.	¼ in.
502BI	Super Twin	½	4 lbs.	4 lbs.	3 pt.	1	½ in.	¼ in.
W502BI	Super Twin	½	4½ lbs.	4½ lbs.	3 pt.	1	½ in.	¼ in.
W502	Super Twin	½	4½ lbs.	4½ lbs.	3 pt.	1	½ in.	¼ in.
752	Super Twin	¾	4½ lbs.	4½ lbs.	3 pt.	1	½ in.	¼ in.
W752	Super Twin	¾	5 lbs.	5 lbs.	3 pt.	1	½ in.	¼ in.
752BI	Super Twin	¾	4½ lbs.	4½ lbs.	3 pt.	1	½ in.	¼ in.
W752BI	Super Twin	¾	5 lbs.	5 lbs.	3 pt.	1	½ in.	¼ in.
1002	Master	1	8 lbs.	10 lbs.	6 pt.	1	⅝ in.	¼ in.
W1002	Master	1	8 lbs.	10 lbs.	6 pt.	1	⅝ in.	¼ in.
1502	Master	1½	8 lbs.	10 lbs.	6 pt.	2	⅝ in.*	¼ in.
W1502	Master	1½	8 lbs.	10 lbs.	6 pt.	2	⅝ in.*	¼ in.
W2002	Master	2	8 lbs.	12 lbs.	6 pt.	2	⅝ in.*	¼ in.
W2003	Std. 3 Cyl.	2	12 lbs.	14 lbs.	8 pt.	2	⅝ in.*	⅜ in.
W3003	Std. 3 Cyl.	3	12 lbs.	14 lbs.	8 pt.	2	⅝ in.	⅜ in.
W5003	Super 3 Cyl.	5	14 lbs.	16 lbs.	9 pt.	2	⅝ in.*	⅜ in.
W7503	Master 3 Cyl.	7½	17½ lbs.	20 lbs.	12 pt.	1	1⅛ in. Pipe	½ in.
W10003	Master 3 Cyl.	10	17½ lbs.	20 lbs.	12 pt.	1	1⅛ in. Pipe	½ in.
332-G	Std. Twin	1-hp. Gas	5 lbs.	5 lbs.	3 pt.	1	½ in.	¼ in.
502-G	Super Twin	1-hp. Gas	5 lbs.	5 lbs.	3 pt.	1	½ in.*	¼ in.
1502-G	Master	3-hp. Gas	8 lbs.	10 lbs.	6 pt.	1	⅝ in.	¼ in.
AW1002	Master	1	8 lbs.	10 lbs.	6 pt.	1	⅝ in.	¼ in.
AW1502	Master	1½	8 lbs.	10 lbs.	6 pt.	2	⅝ in.	¼ in.
AW2002	Master	2	8 lbs.	12 lbs.	6 pt.	2	⅝ in.	¼ in.
AW3003	Std. 3 Cyl.	3	12 lbs.	14 lbs.	8 pt.	2	⅝ in.	⅜ in.
AW5003	Super 3 Cyl.	5	14 lbs.	16 lbs.	9 pt.	2	⅝ in.*	⅜ in.
AW7503	Master 3 Cyl.	7½	17½ lbs.	20 lbs.	12 pt.	1	1⅛ in. Pipe	½ in.
AW10003	Master 3 Cyl.	10	17½ lbs.	20 lbs.	12 pt.	1	1⅛ in. Pipe	½ in.
502T	Super Twin	½	6 lbs.	6 lbs.	3 pt.	1	1⅛ in.	¼ in.
752T	Super Twin	¾	6 lbs.	6 lbs.	3 pt.	1	1⅛ in.	¼ in.
1002T	Master Twin	1	8 lbs.	10 lbs.	6 pt.	1	⅛ in.	¼ in.
1502T	Master Twin	1½	8 lbs.	10 lbs.	6 pt.	1	⅝ in.	¼ in.

(*Aux. 1 in. Suction Pipe)

2. Secure the valve boxes in place, and connect the valves to the lines. Be sure to leave some slack in the tubing for future flaring in case a flare is broken.

3. Run basement lines. In running horizontal lines, it is well to have a slight slope from the risers or the cooling units to the condensing unit. Avoid traps in the line, as oil may collect in them and cause erratic operation. This is especially true where horizontal runs converge over the condensing unit. If oil is trapped in one of these, the other one will get most of the refrigeration.

To increase the capacity of the suction lines and cut down frictional losses, the larger compressors are equipped with ⅝" suction line valves so that ⅝" tubing may be run from the compressor to the point where the risers branch off. These risers should be ½" tubing.

4. Air-cooled condensing units are equipped with LP Penn pressurestats. Water-cooled condensing units are equipped with LS Penn pressurestats. The controls are all mounted on the condensing unit base, with the exception of the ones on the ⅓-hp. and ½-hp. models.

Where the LS control is used, the additional power element is connected with a ¼" tube and tee to the water valve and the high pressure side of the system. These connections are made at the factory. When installing these units, it is only necessary to connect the one power element to the suction line with a tee.

When installing a ⅓-hp. or a ½-hp. condensing unit, the control should be mounted on the wall and connected into the high and low pressure sides of the systems as described above.

5. The water lines should be run in such a manner that the system may be drained in case the basement should ever be subject to freezing, and should have a shut-off valve close to the unit for service purposes. The water control valve is mounted on the machine.

6. Run electric wiring to the motor and the control; use 220 volt, 3 phase current wherever possible. Some of the larger units are equipped with automatic starter switches. These switches carry the current so that the pressurestat merely acts as a pilot switch.

7. Now connect the freezing units and secure the expansion valve capillary tubes to the suction line as close to the units as possible.

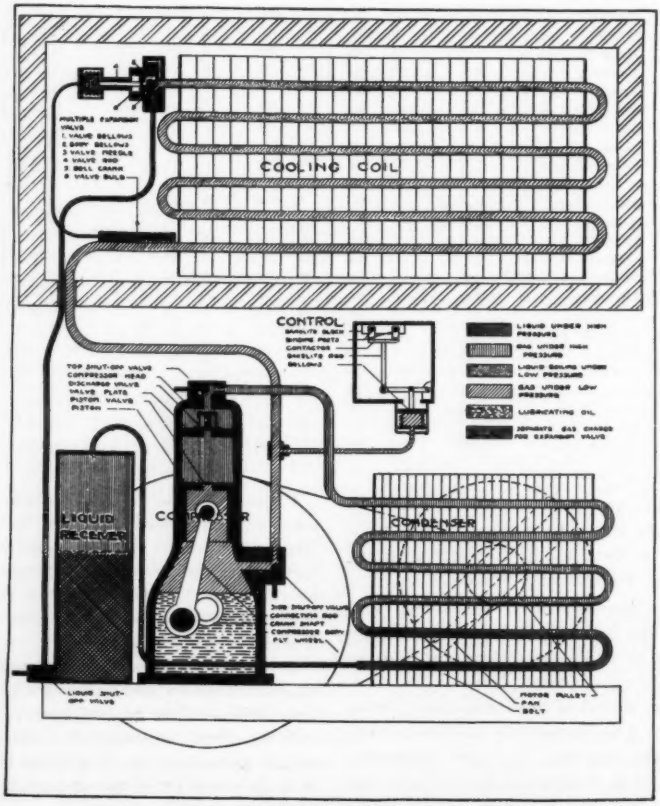


FIG. 1. CYCLE OF UNIVERSAL COOLER OPERATION

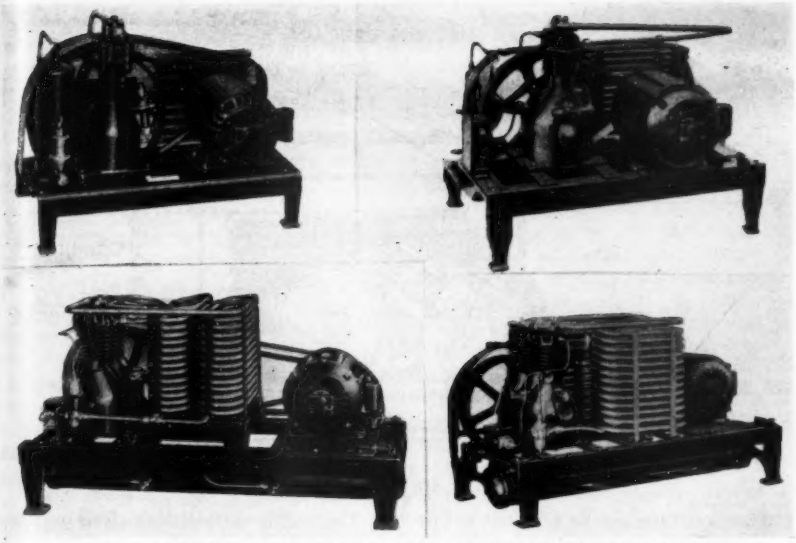


FIG. 2. GENERAL TYPES OF UNIVERSAL COOLER CONDENSING UNITS

Testing and Checking the Complete Installation

Testing for Leaks. After completing the hook-up, go over all the flare nuts with the wrenches, and see that all have been tightened. Use the Leak Detector for checking on leaks.

Starting Up. 1. After testing for leaks as outlined above, start the system, first being very sure that all line valves are open.

2. Check the cut-in and cut-out pressure of the control.

3. Check the expansion valve. If there is a hissing noise, it is vapor, and either the valve is not properly adjusted, or the system is low on refrigerant. If you hear a gurgling noise like water running from a bottle, it is liquid passing through, and is working properly.

4. In the case of a water-cooled unit, set the water valve so that the water leaving the condenser is approximately 15° higher than the temperature of the water at some nearby tap after it has run for a short time. This setting provides economical operation. Check the unit to see that the water shuts off when the motor stops.

Some General Suggestions for Fin Coil Installations

In Top Icers. First, be sure that the air circulation from the bunker is adequate. Air circulation is most important.

The large freezing units used in top icers are large enough that it is not usually necessary to anchor them in place. It is necessary to take out the ice racks before installing the freezing unit. After this is done, put two pieces of ¾" galvanized pipe across the ice bunker and set the freezing unit or units on them. They should hold the coils well off the floor of the bunker.

In Grocery Refrigerators. First, remove the ice rack so that there will be adequate circulation. Put two pieces of ¾" galvanized pipe across the bunker on which to set the coil. The bottom of the coil should be as high as possible off the bottom of the bunker. These coils are lighter, and should be fastened to their support either with copper wire or metal clips.

In Freezer and Display Cases. These coils should always be mounted well off the drip pan in the bunker to provide good air circulation, and should be fastened rigidly in place.

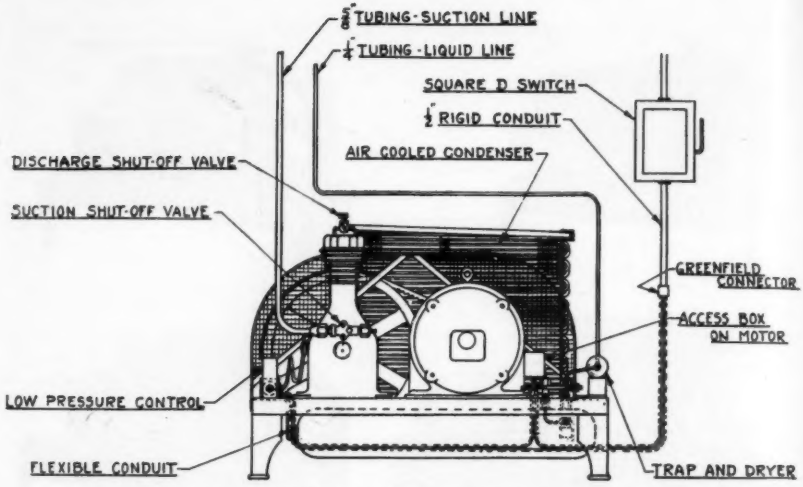


FIG. 3. TYPICAL AIR COOLED INSTALLATION

When installing any fin type coil in a refrigerator, cooler or counter, take the size of the expansion valve into consideration. Have the valve on the coil before fastening it in place.

The most important thing about installing a fin type coil is to give it adequate air circulation. Attention to this before the coil is installed may save revision after the system is in operation.

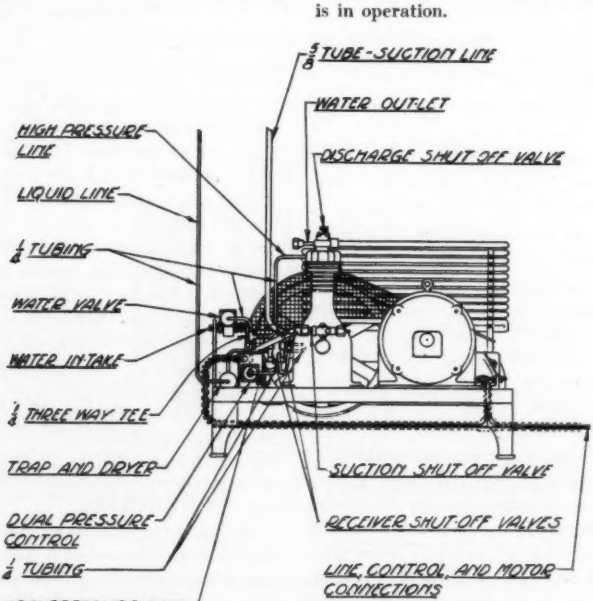


FIG. 4. TYPICAL WATER COOLED INSTALLATION

The Thermostatic Expansion Valve

The American Radiator thermostatic expansion valve, which is used on the Universal compressor, has been completely described and illustrated in past issues of THE REFRIGERATION SERVICE ENGINEER. In these articles have been suggestions as to the most desirable hook-ups employing this type of valve.

Service Valves

There are three service valves on each condensing unit: One on the side of the compressor where the suction line attaches, one on the head of the compressor, and one on the receiver where the liquid line attaches.

It is good practice and we recommend installing a pair of service valves for each freezing unit. The small compact hand-operated line valves are probably most convenient and satisfactory. A pair of service valves on each freezing unit makes it possible to shut off a unit when it is not in use, or to service one unit without interrupting the operation of the others.

The service line valves can be mounted directly on the wall or ceiling if the lines are not run in conduit, or in steel knock-out cabinets, if they are run in conduit. The latter is, of course, preferable, and only slightly more expensive.

It is good practice and convenient for future service work to install a two-way service valve in the liquid line two or three feet from the point where the liquid line attaches to the line valve on the receiver. It will be convenient if it is ever necessary to install a drier or change a trap.

The Methyl Chloride Charge

Fin type coils require very little methyl chloride. There is sufficient methyl chloride in the receiver of the condensing unit when it is shipped from the factory to take care of the usual installation.

Air-Cooled Condensers

Air-cooled condensers are used on some of the machines. They are all of the improved radiator type. All condensers are equipped with standard fittings at both inlet and outlet.

Excessive head pressures are bound to result.

Water-Cooled Condensers

Water-cooled condensers are used on many of the larger condensing units. The water-cooled condensers used on commercial condensing units are all of the double-tube type.

In this condenser methyl chloride vapor is compressed in a copper coil. Through this tube coil, a smaller copper tube is run, carrying water. The hot methyl chloride vapor enters at the top of the outside condenser tube. It is cooled and condensed as it flows to the bottom of the condenser by the cold water that enters the condenser at the bottom in the inside tube.

The inside tube that carries the water is continuous, with both ends outside of the condenser. This does away with any possible chances of a leak from the water system into the refrigerant-containing parts of the system.

The water enters the condenser through the inlet tube at the bottom of the condenser coil. The inlet tube connects directly to the water valve.

The water leaves the condenser through the outlet tube at the top of the condenser. This outlet tube should be connected to a copper tube, lead tube, or pipe leading to the sewer or a drain pan.

Condensing units with water-cooled condensers must never be installed where they will be exposed to freezing temperatures. If a water-cooled condenser that contains water is to be exposed to freezing temperatures due to a store or other place of business being closed during the Winter, disconnect the water lines and blow the water out of the condenser from the top. The pressure in a service tank can be used for this purpose.

Due to the continuous tube carrying the water in a double-tube condenser, they never plug up with dirt or silt. The only service they ever require is a check for leaks at the end connections.

Receivers

There are both inlet and outlet connections on all receivers. The inlet connection sim-

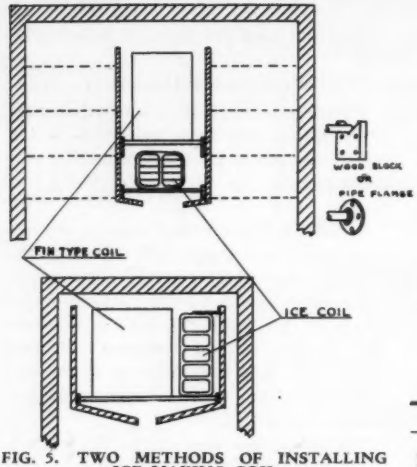


FIG. 5. TWO METHODS OF INSTALLING ICE MAKING COIL

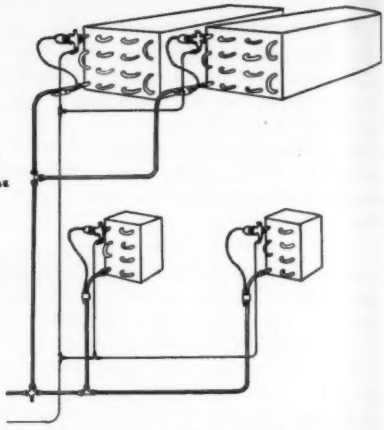


FIG. 6. METHOD OF CONNECTING COILS FOR WALK IN BOX AND END BUNKER DISPLAY CASE SHOWING PROPER LOCATION OF EXPANSION VALVES

ply enters the top of the receiver through a line valve. The outlet connection is fitted with a line valve with a flare connection to attach the liquid line. This line valve, called the "bottom line valve" or "king valve," is screwed or soldered into a boss on top of the receiver. On the bottom of the boss inside of the receiver is a steel tube extending to the bottom of the receiver. This arrangement makes it possible to take liquid methyl chloride out of the bottom of the receiver and still have the connections on the top of the receiver where they are accessible.

Ideal Operation

It is most important, when a system is in operation, that liquid methyl chloride and not vapor be passing into the liquid line. For ideal operation, the receiver should be about one-third full of methyl chloride liquid. This is sufficient to insure a liquid seal at all times, and still leave room in the receiver to pump over any freezing units that may need repair.

Fusible plugs are provided in the receivers of all units ranging in size from 1 hp. and up. These plugs have a metal core that will melt and let the charge out of the receiver if a dangerously high temperature is reached. If one melts, see that it is replaced with a new one after the cause of the trouble has been located and remedied.

Air Circulation

In order to obtain satisfactory results in any refrigerator, the air must circulate freely at all times. Many of the troubles which cause unsatisfactory temperatures can be traced directly to poor circulation.

In every installation, be sure that:

1. The top of the cooling coil does not extend above the top of the warm air flue.

2. Do not allow bulky articles, such as crates or large sides of meat to be placed in any position that will block the cold air duct.

Baffles

A baffle is a partition separating the coil compartment from the food compartment, and should be constructed so as to properly direct the air circulation. See Fig. 7. In designing baffles, it must be borne in mind that warm air rises and cold air falls. Furthermore, when warm air comes in contact with a cold object or with cold air, condensation results.

If a baffle is not properly insulated, it becomes cooled clear through by the cooling unit, setting up eddy currents which retard the upward passage of the warm air outside the cooling compartment. Also, the outside of the baffle becomes covered with condensation. The warm air must be kept separated from the cold air, but there should

FIG. 7. BAFFLE ARRANGEMENTS FOR BUNKER AND COUNTER INSTALLATIONS

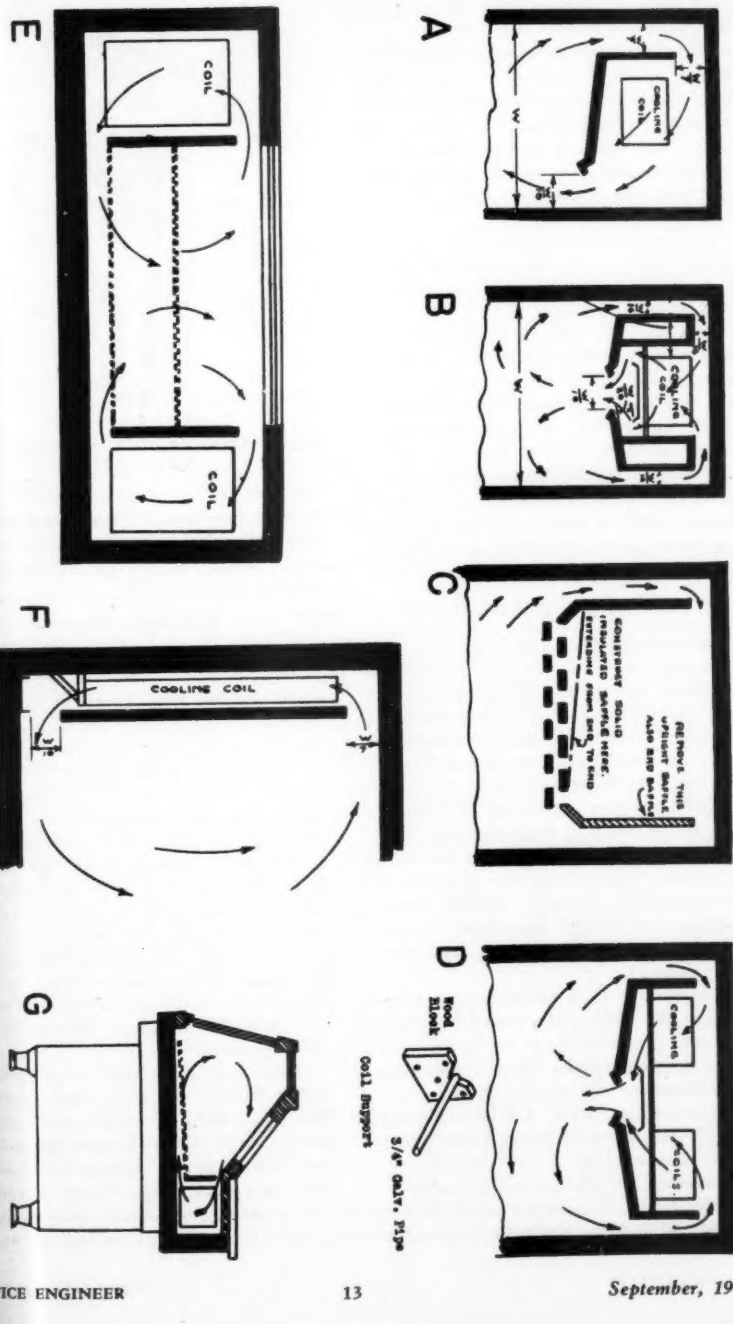


FIG. 7. BAFFLE ARRANGEMENTS FOR BUNKER AND COUNTER INSTALLATIONS

not be any obstruction which will cause eddy currents.

As heat enters the box through the walls, it has a natural tendency to rise. Therefore, the cold air should be directed downward in the center of the box wherever possible. This is especially true where there is any glass surface, as cold air coming in contact with the warm glass causes it to become cloudy.

Old walk-in coolers seldom have insulated vertical baffles. To the outside of the old baffle should be added ½" of insulation covered with sheet metal.

The warm air flue should measure about 14% or one-seventh of the width of the box, and the cold air duct about 10%. If there are two warm air flues, the sum of these should equal 14% or one-seventh. See *A* and *B* in Fig. 7.

Horizontal baffles should slope one inch per foot toward the cold air duct. Slotted bottom baffles in common market type coolers should be remodelled as in *C*, Fig. 7.

Use only spruce or maple in wood baffles.

Penn Water Regulator (Fig. 8)

Description. The Penn Type XLI water regulators are designed for use with refrigerants other than ammonia to automatically control the flow of cooling water over condenser coils and through compressors. They are fully automatic and will flow only the necessary amount of water to maintain proper operating condensing pressures regardless of seasonal temperatures.

Function. This device will do two things: First, maintain an even flow of water at a pre-determined pressure, thereby insuring uniform and efficient operation; second, it will materially cut down the amount of water consumed.

Installation. Care should be taken when making the water valve connection to see that the pressure line is connected to the valve opening marked "inlet"; otherwise, a water hammer will result.

Pressure Connection. Use suitable length of ¼" flexible copper tubing fitted with ¼" S. A. E. connector.

Mounting. In any convenient position.

Adjustment. Loosen set screw in frame holding adjusting screw E-16. Turn adjusting screw E-16 to right (clockwise) to raise opening pressure. Turn adjusting screw to left (anti-clockwise) to lower opening pressure. The closing pressure will be raised or lowered a like amount.

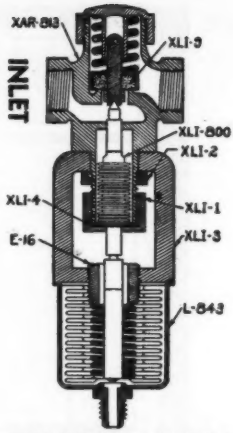


FIG. 8. CROSS-SECTION OF PENN WATER REGULATOR

Compressor Repairs

To test the operation of the compressor, it is only necessary to shut off the line valves by turning the stems in as far as they will go, remove the plugs from the gauge connections on the valves, and let the compressor run with air going through it for a few minutes. If air is discharging from the port on the top line valves, showing that the valves are working, install a pressure gauge in this port, screwing it in tight so that there will be no leak, start the compressor, and let it pump until the gauge shows about 200 lbs. It should pump this pressure quickly and steadily. Stop the machine and watch the gauge. If the pressure holds, or if the needle drops back very slowly, you may be sure that the discharge valve is in good working order.

If the compressor fails to pump the required 200 lbs., but holds what pressure it does pump when the compressor is stopped, the discharge valve is working properly, but the fault is in the suction valve, or possibly the piston rings. After making the test as outlined above and determining that a valve is at fault, it should be removed

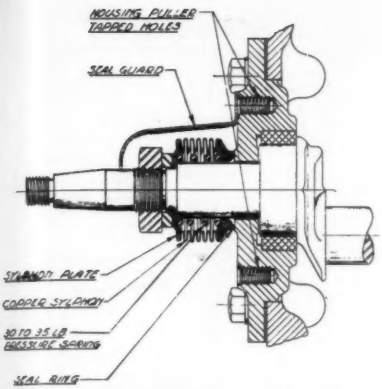


FIG. 9. COMMERCIAL SEAL ASSEMBLY

and examined. Dark spots on the valve disc may indicate foreign matter which was holding the valve open, or a distorted valve disc. If the valve seat is not damaged, the valve can be repaired by replacing the disc.

Cleaning and Oiling the Compressor. Whenever the compressor is dissembled for any purpose, or the bottom plate removed to examine the bearings or connecting rod, it is good policy to discard the oil and replace it with new clean oil. The table on page 7 in this article gives the amount of oil required for each compressor. This should be used as a guide so that the correct amount of oil will be used.

The Seal (Fig. 9)

A seal leak is usually caused by a wear of the two bearing surfaces that roughens one or both of them, and destroys the perfect contact. This is usually caused by some foreign matter or abrasive getting between the two faces and starting a cutting action.

Before you can remove the seal and examine the faces, it is necessary to shut off the two compressor line valves so that the refrigerant charge will not be lost. After this is done, remove the flywheel and the seal cover which is screwed to the front of the crankcase, then unscrew the nut from the crankshaft that holds the seal in place, and remove the seal.

A housing plate with a scored seal face can be repaired by refacing the face in a lathe, and lapping it on a surface plate or with a true stone. The final lapping can be done with a mixture of powdered Bon Ami and oil on a true razor hone, as the surface must be perfectly smooth.

Testing for Seal Leaks. After repairing the seal, give it a thorough test to be sure that it does not leak. It is well to start the compressor and let it run for a short time until the seal seats properly against the housing cover plate. To thoroughly test the seal, it is well to attach a service tank of methyl chloride to the suction line valve on the side of the compressor, keeping it in an upright position so that no liquid will leave the tank. Open the valve on the service tank so that high pressure is admitted to the crankcase, as a leak will be more easily detected. Using an oil can, put oil on the joint between the two seal faces, turn the compressor slowly by hand, and watch for bubbles at this point.

To Stop a Seal Squeak. Seal squeaks are rare. They are caused by the oil film between the two surfaces being broken. To remedy this, compress the seal so that oil comes out between the two seal faces.

General Information. Where the seal attaches to the shaft, no gasket is required. The brass seal plate fits against a shoulder

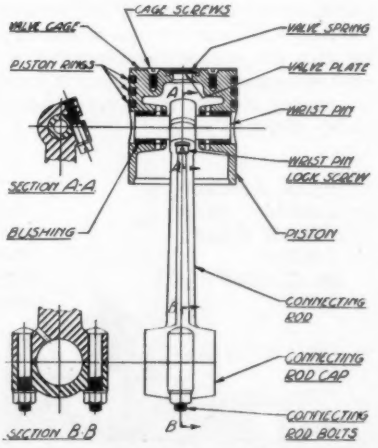


FIG. 10. COMMERCIAL PISTON ASSEMBLY

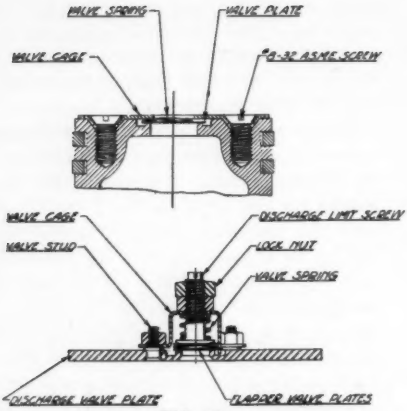


FIG. 11.

Above. Suction valve on all single and twin cylinder compressor. Below. Discharge valve 1/4-1/3-1/2-3/4 hp. compressor

on the shaft, and holds a pressure perfectly if the nut is tight.

When a housing plate is removed for any purpose, or replaced with a new one, a new gasket must be used.

When replacing the housing plate, pull up the cap screws evenly to assure perfect alignment and freedom from leaks.

The Piston Assembly (Fig. 10)

The piston assembly consists of the piston, wrist pin, suction valve parts, and a connecting rod. The connecting rod has a split bearing which can be tightened, if necessary.

Owing to the necessity of a perfect fit on the wrist pin, pistons, connecting rods, and wrist pins are not sold separately. If a wrist pin bearing is loose, the entire piston assembly should be replaced.

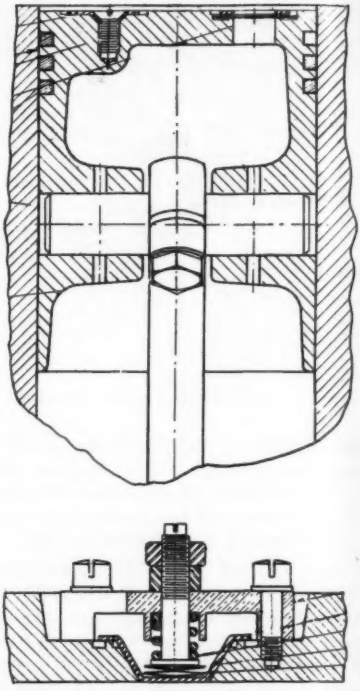


FIG. 13.

Above. Suction valve, 3 cylinder compressors. Below. Discharge valve, 3 cylinder compressors.

If the main connecting rod bearing is loose, it can be tightened by filing the flat surface of the bearing cap. This must be done very carefully, removing an even amount of metal all the way across the flat side of the bearing cap.

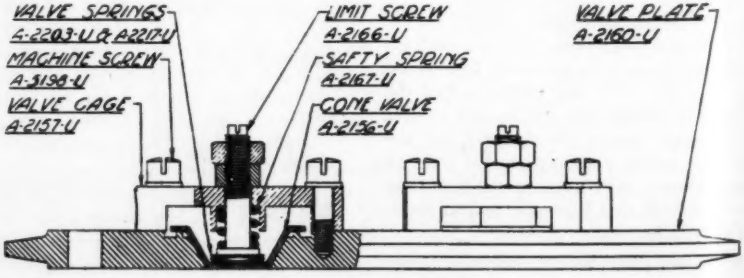


FIG. 12. VALVE ASSEMBLY

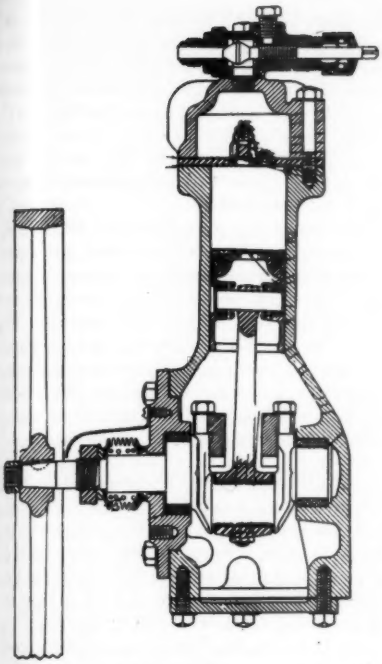


FIG. 14. CROSS-SECTION OF ¼ HP. COMPRESSOR

Discharge and Suction Valves (Fig. 11)

As a rule, the failure of these valves to hold properly is caused by foreign matter between the valve disc and the valve seat, or by a bent and distorted valve disc. An examination of the disc and valve seat will quickly tell you which is at fault. If the valve seat is damaged, the entire assembly should be replaced, while if the disc is at fault, it can be replaced quite readily.

Black marks or spots on the valve seat or disc indicate foreign matter that has held the valve open, or a distorted valve disc. In many cases, thoroughly washing the parts overcomes the difficulty.

When the cylinder head and valve plate are removed for any reason, new gaskets should be used when reassembled.

Piston Rings

A piston ring must move freely in the piston ring groove so that the radial tension will hold it firmly against the wall.

Before putting a new ring on a piston, put it on the top of the cylinder and be sure there is a gap of .004 to .006 of an inch to allow for expansion when heated. The gap can be widened with a file if necessary.

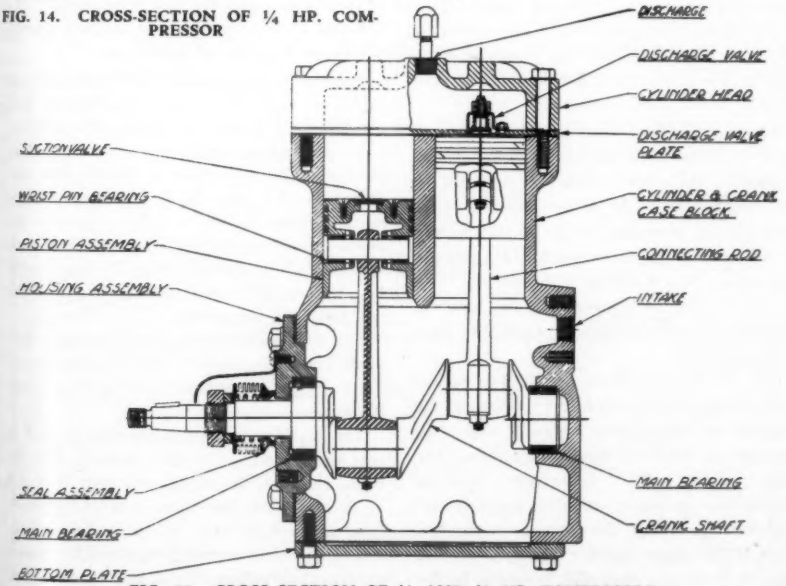


FIG. 15. CROSS SECTION OF ½ AND ¾ HP. COMPRESSOR

THE Question BOX

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment as well as oil burners to "The Question Box" which will be answered by competent authorities.

THE following questions submitted to this department are answered by Mr. George H. Clark, chairman National Educational and Examining Board, Refrigeration Service Engineers Society.

Have any readers other opinions regarding the problems involved. Send them to the Editor.

WORKING PRESSURES

Question 87. (a) When you completely evacuate a system of all air and then charge with gas until the gage shows 0 what pressure have you? (b) Will you have to add 14.5 pounds more before the gage starts to register? (c) If the working pressure in the system shows 90 pounds, is this minus or plus the 14.5 atmospheric pressure?

ANSWER: (a) The pressure when the gage shows 0 is the same on the inside as on the outside of the gage. Then the pressure in the system with the gage showing 0 is atmospheric pressure which in the middle western states is approximately 14½ pounds per square inch absolute pressure.

(b) The gage will move with any increase in pressure in the system in which the gage is installed.

(c) If the gage shows 90 lbs. per square inch pressure, the absolute pressure is the sum of the atmospheric pressure and gage pressure or 104.5 lbs. per square inch. The gage shows the difference between atmospheric pressure and the point in the container to which the gage is connected. Thus if the gage shows a pressure greater than 0, it means that the pressure in the container to which the gage is connected is greater than atmospheric pressure and the absolute pressure is the sum of the gage pressure and atmospheric pressure. If the gage shows a vacuum, it means that the pressure in the container is lower than atmospheric pressure or in other words, the absolute pressure in the container is less than 14.5 lbs. absolute.

The lowest pressure obtainable, of course, is the absolute 0 of pressure which indicates a space entirely empty of any contents. The absolute 0 of pressure then would be a vacuum of 14.5 lbs. or approximately 29 inches of vacuum. When the vacuum gage shows as much vacuum as a barometer shows atmospheric pressure, the container to which the gage is connected has a pressure of absolute 0. There can be no greater vacuum.

WHITEHEAD REFRIGERATOR

Question 88. I have been asked to look at a Whitehead refrigerator and see what it needs to make it operate. The only mark I can find on it is the number 2672 stencilled on the base of the condensing unit, which is direct driven by the motor of ⅛ hp. (a) Can you tell me whether this is the original type of condensing unit for this refrigerator? (b) What is the refrigerant used and how much? (It apparently has all leaked out.)

Answer: The original Whitehead refrigerator is equipped with a condensing unit consisting of a cast iron base with receiver cast in the base and a direct driven compressor. The compressor on the original machine was ¾" bore by ¾" stroke and the motor driving it was a ⅛-hp. repulsion induction Emerson motor. The condenser consisted of a circular coil of fin tubing cooled by a fan on the motor shaft on the opposite end from the compressor.

The refrigerant used in this machine was methyl chloride, about 14 ounces being a complete charge; one pound of refrigerant is not too much.

This machine had a considerable amount of seal trouble and it is quite possible that on being charged, the refrigerant may leak out again in a short time unless you take precautions to check the seal. If the seal does leak, a special socket wrench is required to remove it from the shaft so that it may be replaced.

Question 89. Will you kindly give me any available data and information which you may have on the following: The I. M. E. of 1 ft. of ¼", the I. M. E. of 1 ft. of ⅜", the I. M. E. of 1 ft. of ½", bare copper tubing per hour at 6 pounds back pressure, and the corresponding I. M. E. for the above using a back pressure of 1" of vacuum.

I am also interested in knowing the method of figuring the same.

ANSWER: The heat transfer from copper tubing to air for a natural circulation of air caused by the difference in temperature above and below the cold tube is approximately 2 B.t.u.'s per square foot of tube surface per degree difference between refrigerant and air temperature per hour. Thus it would be impossible to state what the I. M. E. of one foot of the various sizes of tubing would be unless it were known what evaporation temperature we had on the inside of the tube and what air temperature we had on the outside of the tube. You did not state what refrigerant you were using at 6 pounds back pressure so that the refrigerant temperature is unknown as well as the air temperature over the tube.

The heat transfer from copper tubing to water or other liquids may vary from 5 to 15 times the heat transfer from air to copper tubing.

The area of 1 foot of ¼" copper tube in square feet is:

$$\frac{3.1416 \times .25 \times 12}{144} = .0655 \text{ square feet}$$

The area of 1 foot of ⅜" copper tubing is:

$$\frac{3.1416 \times .375 \times 12}{144} = .098 \text{ square feet}$$

The area of 1 foot of ½" copper tubing is:

$$\frac{3.1416 \times .5 \times 12}{144} = .131 \text{ square feet}$$

Thus if we had a 6 pound back pressure with methyl chloride, which would give us an evaporation temperature of approximately 4°, and the tube were in air at a temperature of 40°, the heat transfer for 100 feet of ½ inch copper tubing could be found as follows: $100 \times .131 \times (40 - 4) = 471$ B.t.u.'s per hour.

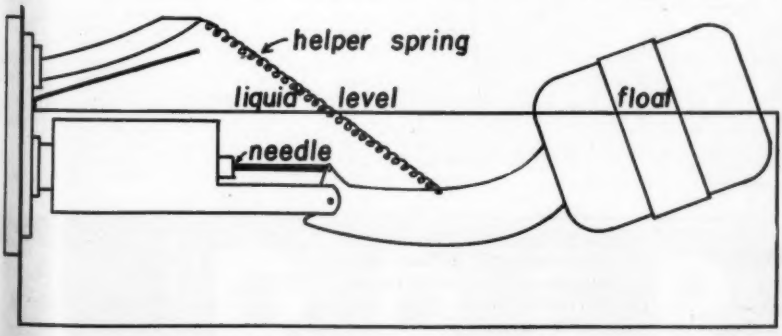
The I. M. E. per 24 hours is equal to 1/6 of the B.t.u. per hour heat transfer; that is, the B.t.u. per hour heat transfer multiplied by 24 gives the heat transfer per 24 hours and this divided by 144 gives us the pounds I. M. E. per 24 hours.

An easy method then is to multiply the heat transfer per hour by 24/144ths or 1/6th to give us the pounds I. M. E. In this case the pounds I. M. E. is 471 divided by 6, which is 78.5 I. M. E. per 24 hours.

If we were to use ⅜" or ¼" tubing, of course the heat transfer would be less by an amount corresponding to the difference in their area. Also, if the difference between the air and the refrigerant were less, the heat transfer would be less by a corresponding amount.

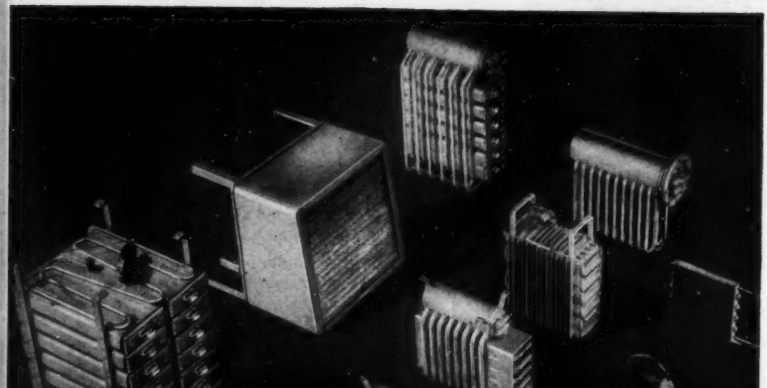
FLOAT CALIBRATION

Question 90. What liquid is used to balance floats for calibration in float testing apparatus? For sulphur, F12 and methyl?



BATH ARRANGEMENT FOR FLOAT CALIBRATION

How Fedders PACKAGE M



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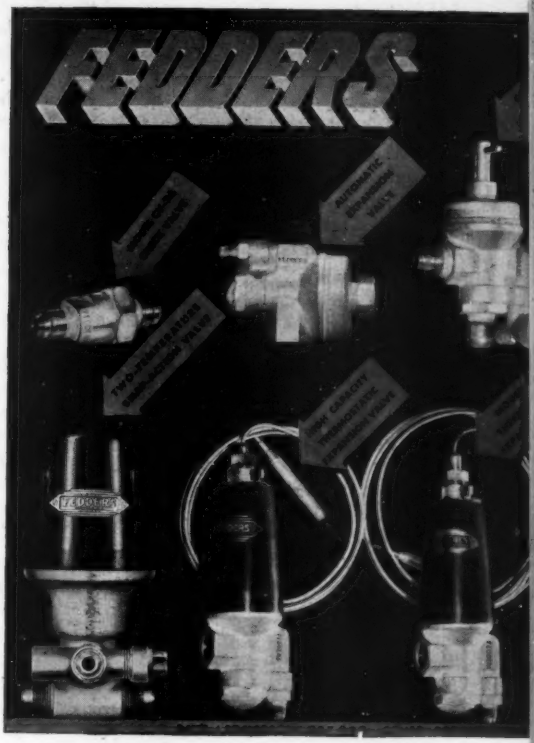

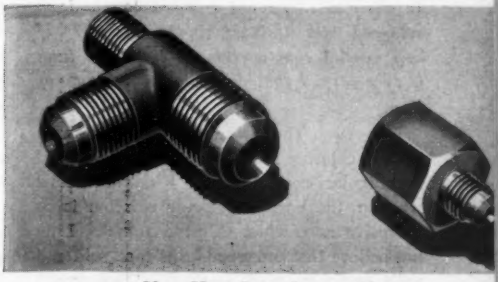

New Heat Interchanger Fitting

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ANSWER: To calibrate a sulphur or Freon float, a bath arrangement such as sketched is suitable, using a solution of 80% carbon tetrachloride and 20% grain alcohol, the solution having those percentages by volume. This solution has the advantage that it drys quickly from the float valve when removed from the solution and the problem of drying afterwards is simplified.

To calibrate a methyl chloride float, the same apparatus may be used, using water in place of carbon tetrachloride and alcohol.

When occasion arises to change a sulphur dioxide or Freon float so that it may be used in conjunction with methyl chloride, this may be done by attaching a helper spring from the float arm to the vapor outlet tube as shown in the sketch. The float should then be calibrated, using water in the bath. Care must be taken, of course, in using water to be sure that the float is thoroughly dried afterwards.

BOAT REFRIGERATION

Question 91. I have a small boat and desire to try your system described on page 23 of the June, 1935 issue. Your article makes everything pretty clear but I should like to get a few technical points clear. When this barium chloride freezes is it necessary to allow for expansion? Is it dangerous to food, corrosive like calcium chloride, etc? In other words, could a closed copper tank soldered with ordinary solder be used? If any special construction of the brine tank is necessary, I should be pleased to know of it.

ANSWER: The brine tank for use with barium chloride solution may be of the usual rectangular construction. I do not know whether the barium chloride solution is as corrosive as calcium chloride or not. I do not believe that a copper brine tank soldered with ordinary lead and tin solder would give any trouble for at least a considerable period of time.

In filling the brine tank a good procedure to follow is to fill the tank up to the top and leave the filler cap open or connected by a tube to an outlet when the tank is first frozen. The expansion of the solution as it freezes will force out any excess brine. When frozen the first time, the filler cap can be replaced and there should be no need for further allowances for expansion of the brine. The tubes should be wrapped close to the tray sleeves so that the brine will freeze at the center of the tank first and gradually work outwards and by the time it is all frozen or nearly frozen, a frost-back may occur which is an indication that the tank is thoroughly refrigerated and that refrigeration can be discontinued until the barium chloride solution has melted and warmed up again.

COPELAND QUESTIONS

Question 92. I have an old Copeland Model N that I am hired to service and there are some questions I would like to have you answer.

What are the normal suction pressures and head pressures in a 70° room?

How is the machine charged?

Is it possible to change to a different refrigerant than Isobutane?

What is the best procedure in testing for leaks such as seal leaks and others?

Will the ordinary paper composition gaskets hold in place of the lead ones on the suction service valve and discharge service valve?

What are the desired temperatures at the cooling unit at cut-in and cut-out?

ANSWER: Normal head pressures for the Copeland Model N machine in a 70° room will be from 50 to 70 lbs. gage pressure. The suction pressure with the expansion valve on the brine tank coil is usually from 0 to 4 inches vacuum. Two inch vacuum would probably be about right.

The machine is charged in the suction service valve at the compressor or in the compressor discharge service valve. If it is to be charged into the suction side of the machine, a tube from the gage connection of the suction service valve to the refrigerant drum is provided and the suction service valve then is turned all the way to the right, closing off the suction line from the evaporator. The valve on the drum is opened and the refrigerant is evaporated in the drum

and drawn into the compressor as a vapor. The complete charge is from 12 ounces to 16 ounces.

If the drum freezes up during the charging operation, it may be placed in a pan of water to keep it from getting too cold and to hasten the evaporation in the drum.

The refrigerant may be charged into the head of the compressor by having the gage connection closed off by backing the valve stem all the way to the left, inserting a fitting into the gage connection and connecting it to the service drum by means of a copper tube. The service drum should then be turned with the outlet at the bottom and the valve open. The two-way service valve is then turned part way to the right, and if the liquid in the service drum is warmer than the receiver of the system, the refrigerant will pass into the liquid receiver provided there is no air or other material in the system which causes such a high pressure that the charge cannot be forced in.

It is quite possible to use sulphur dioxide in place of Isobutane but extreme care is absolutely necessary. The oil should be thoroughly cleaned out and new oil put into the system; and the tubing, evaporator and complete condensing unit should be thoroughly baked and evacuated in order to insure against possible stick-ups in the compressor and trouble in the expansion valve and compressor valves. With the sulphur dioxide in the system, the motor will be approximately 20% heavier loaded. This may be compensated for by putting on a slightly smaller motor pulley. The section pressure should be lowered approximately 2 inches and the head pressure may increase approximately 10 lbs. above the pressure at which the machine operated with Isobutane.

To test for seal leaks or to test for any leaks in the system, a simple and quite reliable method is to connect a tube to the discharge service valve gage connection and put the other end of the tube into a bottle partially filled with oil. Then with the service valve turned all the way to the right and all other valves in the system in their normal operating positions, the machine may be started and any refrigerant or air which may be in the system will be drawn out and a vacuum will be drawn on the complete system. As this is being done, the air or vapor will bubble through the oil quite fast at first but will gradually slow down. If the bubbles keep on diminishing in size and quantity until eventually no bubbles are drawn through—that is, no bubbles are formed—it is a good indication that there are no leaks in the system.

If bubbles do continue to come through, the suction service valve on the compressor may be turned to the right thus closing off the suction line, and with the gage connection plugged, the bubbles should stop forming unless there is a leak in the compressor crank case or seal itself.

In this way, the various parts of the refrigerating system may be isolated to determine what part of the system the leaks, if any, may be in. If there is a leak in the system, air will leak into the system to be pumped into the oil and form bubbles. No bubbles indicate no leaks.

Although the system may test out perfect this way, it is still possible that leaks may occur at the compressor seal when the crankcase is subjected to a pressure considerably above atmospheric pressure, as under this condition the spring holding the seal ring up against the shoulder on the shaft may tend to collapse and allow the seal surface to open and thereby let out air or refrigerant. Ordinarily this may be determined by applying air or vapor to the compressor crank-case at 40 or 50 lbs. pressure and listening for leaks.

Gaskets made from gasket material or some composition of rubber and asbestos will probably be an improvement over the lead gaskets already in the system provided that the valves are not warped so that the paper gaskets do not pull tight around the inlet ports.

The temperature setting for the controls on this type of machine is: cut-in, 24°; cut-out, 17°, the bulb of the temperature control to be immersed in the brine in the brine tank.

John C. Booi,
Missouri.

Each copy of the R. S. E. contains a barrel of good things.

NEW MECHANICAL DEVICES
Service Tools and Special Equipment

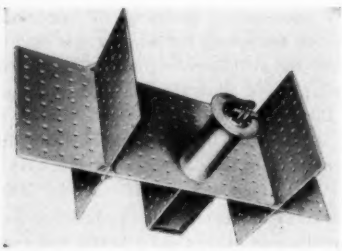
Under this heading there will be published illustrated descriptions of new or improved service tools and equipment for the Service Engineer.

KOLD-HOLD SYSTEM FOR ICE CREAM CABINETS

THE losses suffered by ice cream manufacturers (during the past decade) from soft cream returns have been estimated to have cost the industry many thousands of dollars.

The average stop having 6 to 8 holes may easily carry a cream value up to $50.00 which a refrigeration breakdown can often render a complete loss.

Devices have been employed to eliminate this condition. The hold-over brine system, in which several hundred pounds of calcium brine is carried around the cream cans, is a popular system today, as well as alcohol and water solutions.



DICKERSON "KOLD-HOLD" SYSTEM

Recently announced is the new Dickerson "Kold-Hold" Evaporator embodying a new system of refrigeration. A two-stage hold-over battery is used. This compound A and B cold battery is built right in the Dickerson evaporator, and functions not only as hold-over, but also as an emergency reservoir. In the hold-over battery A, the latent heat of fusion is approximately 1100 B.t.u.'s.

The A battery solidifies and melts with each cycle of refrigeration and provides a satisfactory hold-over.

The latent heat of fusion in hold-over battery B is approximately 3600 B.t.u.'s. This storage battery B always remains completely solidified and is never called upon to function except in emergencies. A predetermined point of fusion is provided in battery B so that its 3600 B.t.u.'s will not come into active use until the cream stored in the cabinet has become noticeably soft.

It is well known that the average storekeeper does not send in a complaint about soft cream until it is soft. It is then that battery B, with its stored capacity of 3600 B.t.u.'s, will hold the cream from getting any softer for another 12 to 16 hours.

During the lapse of time after receipt of the soft cream complaint, and the time the service man reaches the stop, the dealer may continue to dispense cream.

The following advantages are claimed for the Dickerson Cabinets by the manufacturer:

They are dry. Dickerson Cabinets eliminate the need of handling brine.

The Dickerson "Kold-Hold" evaporators maintain a uniform temperature throughout both the on and off cycle of the compressor.

The absorption of heat takes place in a new and unique way. The old method of transmission by conduction is abandoned and a new system is brought into vogue. Both "Kold-Hold" batteries A and B absorb their heat exchange by condensing the refrigerant gases surrounding their immediate vicinity, and instead of a heat exchange by conduction, Dickerson "Kold-Hold" batteries A and B function in the same manner as the compressor unit.

The warm refrigerant gases reaching the plate surfaces of the Dickerson "Kold-Hold" battery are condensed, and the liquid falls by gravity, levelling out to all parts of the evaporator. This liquid level is predeter-

mined and controlled by the calibration of the low side float ball.

It must readily be seen then that since the Dickerson evaporator is of the full flooded type, little variation in temperature is possible, but that the entire evaporator must, by the laws governing this system, maintain a uniform temperature throughout the entire cabinet.

The Dickerson "Kold-Hold" evaporators are so constructed that at no point does this self-contained unit come in contact with the walls of the cabinet. Neither do they suffer a loss of efficiency by means of contact with the rings of the cabinet. The refrigeration effect is confined to refrigerating the ice cream.

The construction of both batteries are so designed that they permit the ice free access to float on top soon after frictional contact is broken by meltage occurring on the outer surfaces of these solidified eutectic ices. This is of vital importance. In this fashion, the stored refrigeration automatically harbors itself in the most advantageous position in reference to heat exchange relationship with that upper part of the evaporator where condensation of the gases is of paramount importance.

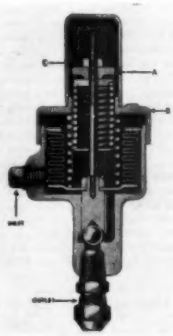
S S S

TEMPRITE— TWO-TEMPERATURE SUCTION PRESSURE CONTROL VALVE

REGARDLESS of its power, capacity or operating efficiency, the commercial refrigerating system is effective only to the extent that it maintains satisfactory and accurate temperature in the fixtures to which it is connected.

In the simple installation in which only one cooling unit is used, the regulation of temperature is a relatively simple matter, since the compressor can be started and stopped in accordance with the temperature requirements of the fixture. As more cooling units are added to the installation, and particularly where different temperatures are to be maintained in the various fixtures, the control of temperature becomes increasingly difficult, particularly in the face of fluctuating loads on the various fixtures.

It is claimed the Temprite Valve will give accurate temperature control through suction pressure regulation for multiple system installations. The same type of regulating valve which is responsible for the maintenance of accurate temperatures in Temprite coolers is now offered as a suction pressure control valve for general commercial use.



CROSS SECTION OF TEMPRITE CONTROL VALVE

This two-temperature valve is equipped with two adjustments, a knurled nut (A) for fine adjustments and an adjusting cap (B) for coarse adjustments. Raising nut (A) raises the pressure at which the cooler will operate and turning it down lowers the cooling unit pressure. The knurled nut is held in position by a lock nut (C) which must be loosened before adjustments are made. If sufficient change of pressure cannot be obtained by the use of nut (A) the adjusting cap (B) should also be used. Turn down to increase the cooling unit pressure and up to lower it. *Caution*—Before turning the adjusting cap up, nut (A) should be loosened sufficiently so that it exerts no pressure on its spring. After the coarse adjustment has been made by use of the cap, nut (A) should be turned down again until it engages the spring for final setting.

It is said that this control valve, of the throttling type, is extremely sensitive, responding to the slightest changes in the unit to which it is connected. Further, that it will maintain its adjustment permanently, opening easily and closing tightly, and maintain its adjustment regardless of the cycle on which the compressor is operating. It will handle large quantities of gas with very low pressure drop, thereby providing regulation without sacrifice of capacity or efficiency.

Motor Trouble Charts—How t

REPULSION INDUCTION–SINGLE PHASE MOTORS

SYMPTOMS:

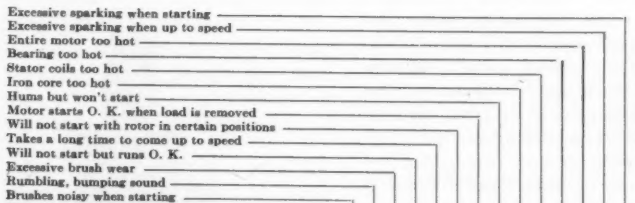


Chart showing symptoms and some of the most common possible causes of repulsion induction motor troubles with practical remedies and tests. Often a combination of a number of symptoms makes it easier to locate the exact trouble quickly.

CODE

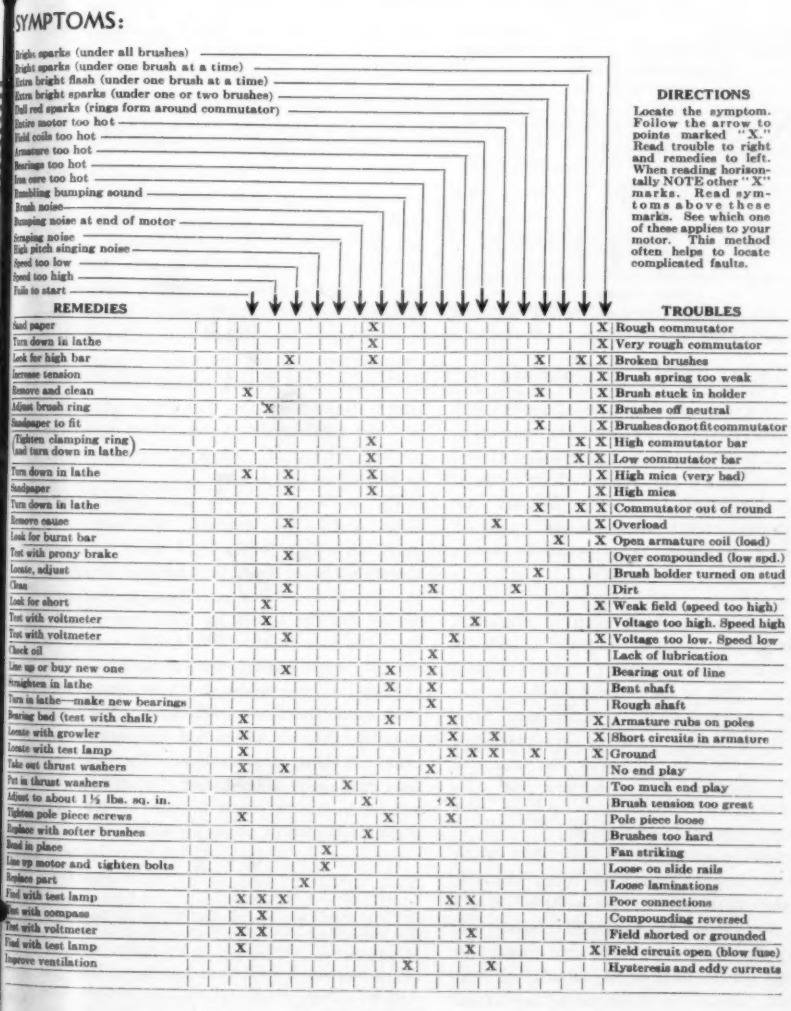
L—Brush lifting type.
R—Brush riding type.
X—Both types.
W—With load.

REMEDIES	TROUBLES
Sandpaper	Dirty commutator
Sandpaper	Rough commutator
Replace with new	Brushes worn very short
Clean with gasoline	Brushes stuck in holders
Set arrow on index mark	Brushes not set on neutral
Replace rotor	High or low bars
Sandpaper	High mica
Remove cause	Overload
Look for burnt bar	Open rotor coil
Test in growler	Shorted rotor coil
Locate with test lamp	Open stator coil
Test with wattmeter	Shorted stator coil
Locate with test lamp	Grounds
Check connections	Wrong connections
Locate with test lamp	Poor connections
Check oil	Lack of lubrication
Line up or replace	Bearing out of line
Straighten in lathe	Bent shaft
Bearing bad (test with chalk)	Rotor rubs on stator
Take out thrust washers	No end play
Put in thrust washers	Too much end play
Bend in place	Fan striking
Line motor and tighten bolts	Loose on slide rails
Replace part	Loose laminations
Test with voltmeter	Voltage too high
Test with voltmeter	Voltage too low
Locate with test lamp	Fuse blown
Locate with test lamp	Overload release open
Locate with test lamp	Switch contacts bad
Clean with gasoline	Governor mechanism out
Adjust spring tension	Governor not adjusted
Clean with gasoline	Dirty shorting device
Check shaft and bearing	Air gap not uniform
Test on parallel knife edges	Rotor unbalanced
Improve ventilation	Hysteresis and eddy current
Replace rotor	Defective squirrel cage

Editor's Note: These charts were prepared by Fred W. Butler for use in connection with the Sch of Refrigeration, Greer College, Chicago, and are reprinted with permission.

Locate Troubles—Their Remedies

DIRECT CURRENT MOTORS



DIRECTIONS

Locate the symptom. Follow the arrow to points marked "X." Read trouble to right and remedies to left. When reading horisontally NOTE other "X" marks. Read symtoms above these marks. See which one of these applies to your motor. This method often helps to locate complicated faults.

The REFRIGERATION SERVICE ENGINEER

A Monthly Illustrated Journal, Devoted to the Interests of the Engineer Servicing Refrigeration Units, Oil Burners and other Household Equipment.

Vol. 3 September, 1935 No. 9

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Official Organ
REFRIGERATION SERVICE ENGINEERS' SOCIETY

THE CREDIT PROBLEM

GET a group of service men together and invariably you will find the conversation will drift around to a discussion of the credit problem. The credit situation is a vital factor in any business. We have all learned that credit is an essential part of successful business today—that is, good credit.

Some of these credit losses in this business, upon investigation, have been so apparent that it would seem to indicate a lack of understanding of common sense business methods. This is no general condemnation of the business methods that have been adopted by many servicing organizations, but is intended to emphasize the necessity for the adoption of a systematic and consistent standard without fear or favor that will settle this matter of credit.

Further questioning discloses that credit losses are largely among the small domestic servicing jobs. After completion of the work, the request for payment is made, and usually the excuse is made that "our bills are paid on the first of the month," or "my husband takes care of all bills," and from then on, if it is a poor credit risk, it is a matter of "try and get it."

The cost of collections come high, especially on small charges, and if the servicing organization has any sort of a cost system, it can be readily determined if these collections are not costing considerably more than the price of the original job.

Speaking recently with a man, who is well informed in the matter of collections and who has made a survey of credits in the servicing business, he stated that most past due bills could be classed with the bill for a physician's services that was many years old, and he frankly stated that this latter class of bill could be rated as among the worst kind of uncollectable debts.

There is only one way to stop this imposition on the servicing business. Get hard-boiled—hard-boiled in the sense that prompt and efficient service is furnished on a cash basis. No one can object if it is their desire to establish credit, to furnish such credit references as will satisfy you as to the purchaser's integrity. When you desire to buy on open account at any supply house, you are required to furnish good credit references. Remember, too, that the maintenance of your good credit is dependent upon the prompt receipt of your collections, in order to meet your obligations.

The servicing business must take definite steps against the habitual "deadbeat." In many cities, at the present time, a credit system is under discussion for the benefit of this business, similar in nature to that conducted for the benefit of other merchandising establishments. This credit matter is one of much importance in the successful conduct of your business. A credit system, such as outlined above, to work effectively, requires the whole-hearted cooperation of every servicing organization. This cooperation certainly should not be difficult to secure inasmuch as it is one of the best methods known of stopping loss.

S S S

F. Henry, Oklahoma.

Find enclosed check for $2.00 in payment for renewal to your valuable magazine, THE REFRIGERATION SERVICE ENGINEER. I have never missed a copy yet but have lost the August, 1934, issue. Can you supply this back number? If you have dropped my name, be sure to send the June and July issues.

REFRIGERATION SERVICE ENGINEERS' SOCIETY

Official Announcements of the activities of the National Society and Local Chapters appear in this department as well as articles pertaining to the educational work of the Society.

THE OBJECTS OF THE SOCIETY

To further the education and elevation of its members in the art and science of refrigeration engineering; with special reference to servicing and installation of domestic and small commercial equipment; for the reading and discussion of appropriate papers and lectures; the preparation and distribution among the membership of useful and practical information concerning the design, construction, operation and servicing of refrigerating machinery.

ASSOCIATION HEADQUARTERS: 433-435 North Waller Ave., CHICAGO, ILL.

On to Detroit

For the 2nd Annual R.S.E.S. Convention Detroit—Three Days—October 23, 24, 25

PROGRAM plans are practically complete for the important event of interest to the entire servicing field—that is, the Second Annual Convention of the Refrigeration Service Engineers' Society. All roads lead to this refrigeration center October 23, 24 and 25. If you have not definitely decided to be present, make arrangements now to attend this important educational conference of vital interest to you.

The Program

The educational program is going to be well worth the time of every service man. It will not only be educational from the standpoint of improving your knowledge and understanding of the service business, but it will be an inspirational meeting, returning you to your business ready for more improved service methods. The program has been designed for the benefit of every service man interested in the advancement of himself and this growing business. Morning sessions are set aside for the presentation and discussion of pertinent subjects on refrigeration servicing. New developments, improved business methods, methods of doing a more efficient job, and many other equally interesting subjects are included in the program.

The afternoons are reserved for conducted tours to plants where those attending the convention will have the opportunity of seeing at first hand, the manufacture of refrigerators and refrigeration accessories. Open house will be held by all of the various refrigeration manufacturing companies for the "conventionites." This feature of the program alone is worth the entire cost of your visit to Detroit.

Evenings are set aside for entertainment. Evan L. Hughes, chairman of the Detroit Entertainment Committee, has promised events that will always bring back pleasant

recollections of your visit to Detroit. Evening entertainment is for the ladies, too.

And Bring the Ladies

This convention will not be complete without the ladies. Mrs. Joseph Oberc, chairlady of the Ladies' Entertainment Committee, is charged with the responsibility of seeing that the ladies are amply entertained while the convention is in session.

Manufacturer's Exhibit

Of considerable importance in the Second Annual Convention is the manufacturer's exhibit. Twenty-six exhibits will comprise this feature. Here the leading manufacturers will exhibit their products, with engineers in attendance to fully explain the features of their respective lines. Again, this will be an important contribution to the educational features of the program. Practically all available exhibit space is under reservation, with only a few spaces remaining, and most of these being tentatively reserved. The following is a list of the exhibitors who will be represented:

Refrigeration & Air Conditioning Institute
Electrimatic Corporation
The Rotary Seal Company
Utilities Engineering Institute
Airo Supply Company
George Monjian Company
Standard Refrigeration Parts Company
American Injector Company
Wolverine Tube Company
The Starr Company
Fedders Manufacturing Company
Detroit Lubricator Company
Virginia Smelting Company
Servicemen Supply Company
Automatic Reclosing Circuit Breaker Company
Ansul Chemical Company
Henry Valve Company
Copeland Refrigeration Company
Imperial Brass Manufacturing Company
Trico Compressor Service

In charge of the general convention plans is the President of Detroit Chapter, James H. Downs. The various committees are busily engaged in completing the final arrangements for the Second Annual Convention.

JAMES H. DOWNS
Convention Chairman

MRS. JOSEPH OBERC
Ladies Entertainment

EVAN L. HUGHES
Entertainment Chairman

Hotel Reservations

The convention and exhibits will occupy the Spanish Room of the Hotel Fort Shelby, which is centrally located in Detroit, and reservations for rooms can be made direct to the hotel. In making reservations, please be sure to state for the Refrigeration Service Engineers' Society Convention.

Those who will drive to the convention will find convenient and ample parking facilities directly across from the hotel.

Make Your Plans to Be in Detroit October 23, 24 and 25

DETROIT CHAPTER

Meeting of August 21

By J. E. PERRY, Secretary

THE regular August meeting of Detroit Chapter R. S. E. S. was held on August 21, at 8:30 p.m. at the United Motors Building on Milwaukee Ave. Through the courtesy of Mr. Chas. Clemens of United Motors, the Detroit Chapter has been offered the use of the large meeting room they have for our regular meetings.

The meeting was called to order by President J. Downs, who introduced Mr. Clemens. Mr. Clemens gave a short address of welcome and assured the Detroit Chapter of the continued cooperation and support of his organization. Mention was made of a very interesting surprise they would have for us at our next regular meeting, the nature of which they would not disclose but you can rest assured that it will be something well worth waiting for.

This very mysterious surprise should be an added incentive for everyone to attend the next meeting and a full house is looked for. While on the subject of a full house, last night's meeting was the best attended in some time. If this old secretary's eyes are not failing him, forty-eight heads were counted.

Mr. Downs then introduced Mr. Leo Gage from the Department of Building and Safety Engineering for the City of Detroit, who gave a splendid talk on "Safety in Regard to Refrigeration and Air Conditioning Installations," and then spent some time clearing up some points that were puzzling to all of us in connection with refrigeration ordinances.

The next topic was a general discussion of the Refrigeration Service Men's Credit Association, the object of which will make information available to members as to whether customers are graded as "deadbeats" or "slow pay" or "good credit." In connection with this, it may help us to collect some of the accounts that have been troublesome.

President Downs then discoursed on the latest developments in plans for the Na-

tional Convention to be held in Detroit in October.

The meeting was adjourned and refreshments were served with the compliments of United Motors. A general good time and a very profitable evening was had by all those who attended.

The Detroit Chapter feels deeply indebted to United Motors for their generosity, and we take this opportunity to thank them for all the boys in the Chapter.

CHICAGO CHAPTER

Meeting of August 13

By H. D. BUSBY, Secretary

PRESIDENT JACOBSEN made the announcement that Sunday, August 18, would be the day of the R. S. E. S. picnic to be held at the Waukegan Dunes just north of Waukegan. Everyone was invited to attend, and members were instructed to meet just inside the entrance gate. Swimming, ball playing, and any other outdoor amusements the members would care to participate in would be the order of the day.

For the educational program for the evening, Mr. Herman P. Scher gave a very interesting talk on the relationship of credits to the refrigeration business. In the questions and answers that followed, it was brought out by Mr. Scher that the service business is probably the hardest one to deal with in collections and credits and that the company, due to its necessary laxity in determining the nature of their customers before dealing with them, has practically no legal protection and its only recourse is through the filing of a suit to collect.

Mr. Scher further pointed out that the service industry at large is in great need of—first, a credit information bureau; second, a central collection bureau; and third, a uniform minimum charge for service.

A motion was made by Mr. Harry Drownes, seconded, and duly carried, that Mr. Scher be asked to accept a membership in the Society and thereafter be formally appointed attorney for the Chapter, and that members be asked to cooperate with him to the extent of taking their collection troubles to him. Mr. Scher accepted the membership and suggested that he compile some line of attack which he hoped would overcome some of the major difficulties. He also asked that a committee be appointed to work with him to this end. Mr. Drownes was appointed chairman of this committee by President Jacobsen, with the power to select his own committee members.

Mr. E. P. Sorenson, of the Utilities Engineering, was introduced at this time and it was announced that he had very generously provided the refreshments for the evening.

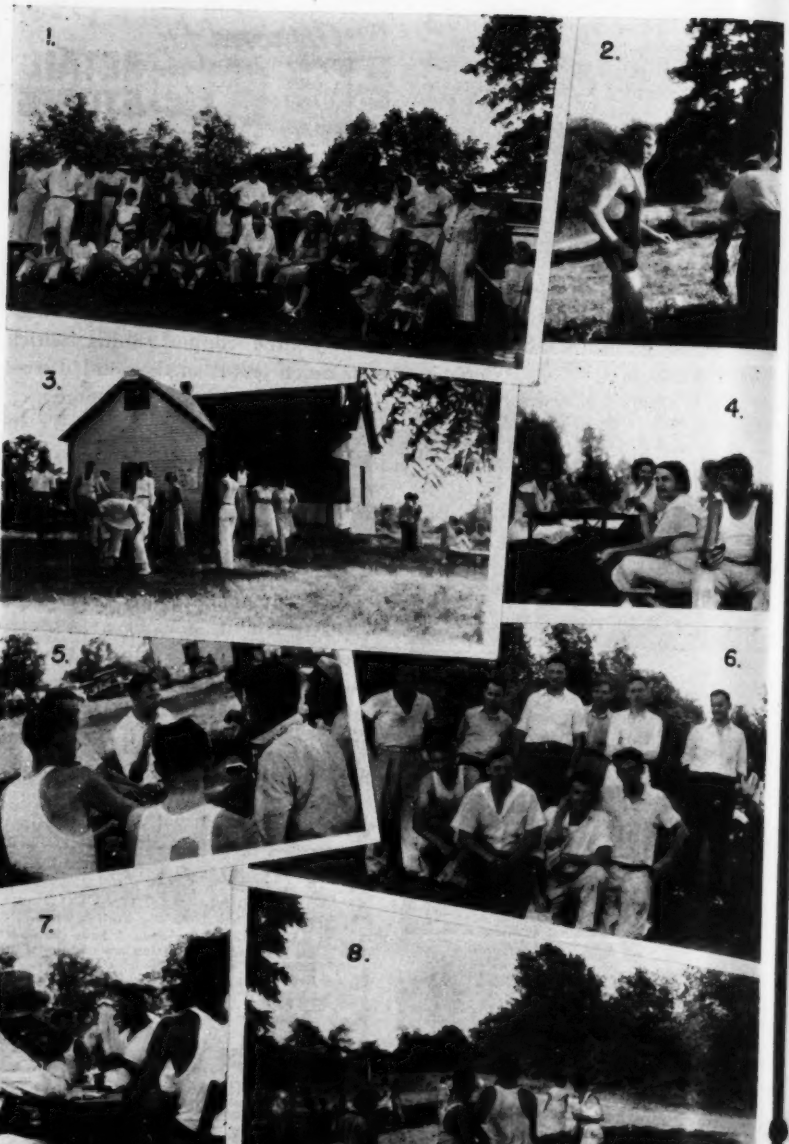
CHICAGO CHAPTER PICNIC

IDEAL picnic weather greeted the members of Chicago Chapter and their families on Sunday, August 18th.

The picnic grounds selected by the Com-

THE CAMERA MAN CATCHES CHICAGO CHAPTER MEMBERS AT PLAY

Views on opposite page are snaps taken at the picnic of Chicago Chapter. The members and their families enjoyed an eventful day including, swimming, baseball, horse shoes, cards, etc.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mittee proved ideal for the outing and were located in the Illinois Dunes just north of Waukegan, Illinois, where every facility was available for the entertainment of all.

Lake Michigan, with its inviting beach, was a popular spot throughout the day for those who like bathing for their diversion. Of course, the usual soft ball games and horse shoe pitching contest had their adherents. Good Old Sol got in his day's work, and several members have been sporting a rosy-hued color ever since.

* * *

ST. LOUIS CHAPTER FROLICS AT PICNIC

WITH an ideal day to get away from the busy servicing season, which the members of St. Louis Chapter have been enjoying during the hot weather which is not peculiar to St. Louis, members of the Chapter and their families enjoyed a good old-fashioned picnic on Sunday, August 4. Through the courtesy of Ray Pennington, vice-president of St. Louis Chapter, the picnic was held at his summer cottage, The Riverview Club at Wild Horse Creek, approximately twenty miles outside of St. Louis. The Club was turned over in its entirety to the members of the Chapter for their enjoyment.

It was a good old-fashioned basket picnic with everyone contributing their share to see that the desires of the "inner man" were provided for. The refreshments, including plenty of pop and ice cream, were provided through the courtesy of the parts distributors of St. Louis. The picnic, of course, would not have been complete without the usual ball games, horse-shoe pitching contest, and other events that made the day all too short when the time came for the trek homeward.

ST. LOUIS CHAPTER MAKES MERRY AT PICNIC

Opposite page views. 1. A part of the group which attended. 2. Ray Pennington goes for a swim. 3. The base ball game. 4. Just resting. 5. The card game is serious business. 6. The officers pose for a picture. 7. Still interested in the card game. 8. It's the Sulphur's turn at bat, while the Meythl's get their workout in the field.

J. D. Gray, president of the Chapter, and E. A. Plesskott, secretary, as well as the others responsible for the holding of the first picnic by St. Louis Chapter, may feel amply rewarded for their efforts in providing this ideal time for all, and it presages the holding of this event annually by the Chapter.

EXAMINATIONS FOR CERTIFICATE MEMBERSHIP

THE National Educational and Examining Board has recently completed the preparation of the examination questions for Certificate membership. The questions are now being printed and will be released on September 10th.

Any member of the Society is eligible to take this examination and secure the Certificate of Proficiency which will be awarded to the members successfully passing this examination. The examination comprises fifty questions and the answers returned to the National Secretary's office before October 5th will be acted upon by the National Board at the forthcoming convention. All answers received after this date will be acted upon by the Board after the convention.

ST. LOUIS CHAPTER

Meeting of August 8th

By E. A. PLESSKOTT, Secretary

A REGULAR meeting of the St. Louis Chapter was held at the Crunden Library on August 8th.

President Gray thanked all men who worked so hard to make our picnic the success it was, and remarked that it was an education to him, and our experience should serve us well next year.

Mr. Petri reported on his finding one or more suitable meeting places, and action will be taken at a later date if it seems advisable. The location not being satisfactory to some, it was suggested by Mr. Gray that these individuals scout around in the vicinity in which they desire to meet and report their findings at our next meeting.

Mr. Jerome Robins, our past president, was a visitor and at the request of Mr. Gray gave us a brief resume of his trip west.

Mr. McKenna of the American Radiator Company who was to have been our speaker this evening was called out of town late this afternoon, and advised Mr. Spangler accordingly.

Our own dependable stand by Mr. O. J. Brooks was "pushed" into this breach, and gave a good account of himself on his talk, and the answering of questions in regard to the chemical properties, proper handling and reaction under certain conditions, of methyl chloride.

Meeting of August 22nd

Mr. Krueger reported for the membership committee. It seems men are holding off until after the first of the year, due to the fact the season is so far advanced.

The Secretary gave a complete report of his rounds of the bus ticket offices and requested that all who intend to go to the Convention at Detroit notify him no later than October 10th, this being our last meeting prior to the Convention.

It was requested that the Secretary get the complete program of the Convention, and especially the plans being made for the entertainment of the visiting ladies, as it seems some of our members cannot leave town without them.

There being no further business, the meeting was turned over to R. H. Spangler, chairman of the Educational Committee, who introduced Mr. Marc Shantz of the Fedders Mfg. Co.

Mr. Shantz, with the aid of a small projection machine, went to work as only a man who knows and loves his work does, and after about an hour and forty-five minutes was still going strong, only the lateness of the hour seeming to cramp his style.

The thermostatic expansion valve was dwelt on at great length, since the membership had requested this at a previous meeting. All who were fortunate enough to be present benefited greatly.

President Gray thanked Mr. Shantz on behalf of our membership and requested that he favor us again this coming winter.

KANSAS CITY CHAPTER

Meeting of June 25th

By C. F. RAMEY, *Secretary*

KANSAS CITY CHAPTER NO. 1 held its meeting of June 25th at the Phillips Hotel, 12th and Baltimore, Kansas City, Mo., with President S. A. Leitner presiding.

The membership committee turned in the approved applications of M. C. Haigh, Dennis McGrath and W. L. McWade, and same were referred to the Board of Directors for final action.

Suggestions were made regarding different places for holding our meetings. President Leitner authorized Secretary Ramey and H. L. Green to investigate the possibility of holding meetings in the Kansas City Power & Light Building.

Subject of credit information for and among members was brought up and the discussion was entered into by most of the members present. Methods of getting information on bad credit accounts were discussed and the Secretary was instructed to write the Better Business Bureau and local credit bureaus and secure from them their methods of dispensing credit information to their members.

Mr. Kingsolver offered the suggestion that members obtain from the National Secretary a copy of the official emblem and seal of the Refrigeration Service Engineers' Society, and use same on their stationery and statements.

Mr. W. R. Jones, chairman of the Educational Committee, having been away on his vacation and not having had time to prepare any educational talk, and there being no further business, the meeting adjourned.

Meeting of July 23rd

Kansas City Chapter No. 1 held its July 23rd meeting at the Phillips Hotel, 12th and Baltimore, Kansas City, Mo.

Application of Forslund Pump and Machinery Company was received and submitted to the Membership Committee for action.

The oath of the Society was administered to the following: J. E. Altop, Roy T. Bentley and Miss Jane Merritt.

Mr. Jules P. DeWilde, chairman of the Committee on Standards, gave a short report of a meeting of that committee which had met and discussed the subjects of a minimum service charge and motor repair prices. No specific recommendations were submitted and another report will be made after further study is made.

The matter of a regular meeting place was discussed again, with no final decision being made. It was left to the officers to find the most suitable place at the lowest rate.

CHICAGO CHAPTER CHATTER

By HERMAN GOLDBERG

REGARDING this big national convention of ours which is, as you all know, going to be in Detroit the latter part of October—our president, Paul Jacobsen, tells me that he expects the Chicago Chapter to have the largest delegation of visiting members to this convention, and I think that President Jacobsen's expectations are well founded.

— Not only are we going to have a large representation of Chicago members, but it is surprising to learn of the number of the boys who are going to bring their wives.

— Insofar as the convention itself is concerned, it is practically assured that we are going to have one of the grandest successes ever achieved by an organization such as ours. You will no doubt be extremely pleased to learn that almost all the display booths already have been reserved by manufacturers from all over the country.

— Well, we had a nice pleasant picnic since the last issue of this magazine and outside of the fact that one of the boys almost lost a wife in Lake Michigan and later on almost broke his back hitting at an indoor ball everybody including the injured and the rescued had a wonderful time. My sympathies, of course, went to our pal, Ivar Skipple, who unquestionably won a prize for an all round rosy complexion. All a fellow had to do toward the end of the day was to throw a little salt on various parts of Ivar's anatomy, and he would have a well cooked meal.

— But Ivar was not the only one who was burnt rare. Our national secretary also got blistered plenty as did Arnold Schroeder of the Rex Company who came out with his gang. Incidentally, our national secretary must be keeping something from us. The way Mac can throw a ball down the line is nobody's business.

— This might be a good time to ask Harry Drownes if he always gets off the right horse at the wrong time. How about it, Harry?

— This bowling league that we talked about at the last meeting ought to give the boys a lot of fun, exercise, and aches. I am going to apply for the linament concession at the bowling alleys, at least the first and second time that the boys will try their skill.

— Coming back to the convention, fellows, it might be a good idea for those who are sure that they will attend, to register with our secretary letting him know which means of transportation they are going to use and whether they are contemplating bringing their wives. This ought to be mentioned at the next meeting.

— Following the convention, I am contemplating changing the heading of this column of Chicago Chapter Chatter. In the meantime, send all the other fellow's secrets to me at my address, 5101 West Madison St., or telephone my office, Austin 6343.

BAKER ICE MACHINE ISSUES SALES BULLETIN

THE Baker Ice Machine Co. of Omaha, Nebraska, has recently issued five interesting bulletins pertaining to various applications of refrigeration which will be mailed to all those interested in the fields covered by the different bulletins.

The bulletins are attractively illustrated, containing pertinent information regarding the application of Baker compressors to various types of installations covering air conditioning, refrigeration for trucks, for general commercial and industrial purposes and breweries, as well as an illustrated analysis chart of the construction of the Baker compressor.

K. A. Barnes, Iowa

It's the best $2.00 I've invested in refrigeration—my subscription to the R. S. E.

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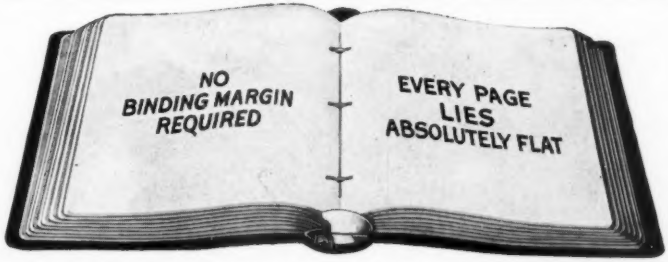

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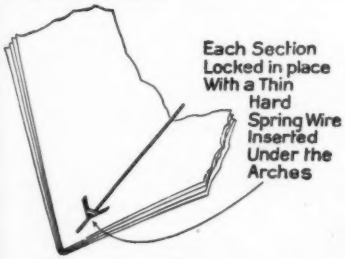

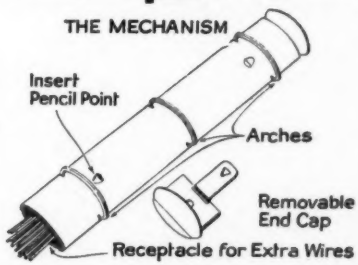

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